

AMENDMENTS TO THE SPECIFICATION

Delete the original pages containing Tables 1-23.

Insert between page 38 and page 39 the following pages including Tables 1-23.

Table 1

(Unit: Percent by mass)

Name of material	Quality	C	Si	Mn	P	S	Cu	Ni	Cr
Mild steel	A	0.036	<0.01	0.20	0.012	0.007	0.013	0.014	0.020
	B	0.010	<0.01	0.25	0.006	0.004	0.011	0.012	0.019
Cr-Mo alloy steel	C	0.025	0.50	1.14	0.003	0.007	0.012	0.084	1.39
	D	0.031	0.48	1.10	0.007	0.005	0.013	0.031	2.44

Table 2

(Unit: Percent by mass)

Name of material	Quality	Mo	Al	Ti	Nb	V	B	N	Mg
Mild steel	A	0.005	0.038	<0.002	0.003	<0.002	<0.0002	0.0024	<0.002
	B	0.002	0.008	<0.002	0.003	<0.002	<0.0002	0.0033	<0.002
Cr-Mo alloy steel	C	0.48	0.004	0.002	0.003	0.003	<0.0002	0.0080	<0.002
	D	1.10	0.002	<0.002	0.003	0.004	<0.0002	0.0090	<0.002

Table 3

Wire No.	Comparative example 1	Comparative example 2	Comparative example 3	Comparative example 4	Comparative example 5	Comparative example 6	Comparative example 7	Comparative example 8
Sheath quality	B	B	B	B	B	B	B	B
Flux ratio (% by mass)	17.0	17.0	17.0	14.0	14.0	16.0	16.0	16.0
Slag-forming material content (% by mass)	8.228	8.228	8.228	6.776	6.776	7.696	7.744	7.760
Composition (% by mass)	C	0.218	0.039	0.040	0.038	0.055	0.042	0.037
	Si	0.664	0.051	1.415	0.537	0.566	0.615	0.593
	Mn	1.451	1.381	1.387	0.541	1.623	1.369	1.373
	P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	S	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	Cu	0.009	0.010	0.009	0.010	0.010	0.009	0.010
	Ni	0.010	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.525	1.322	1.325	1.267	1.267	2.659	1.396
	Mo	0.503	0.502	0.502	0.413	0.413	0.953	0.292
	Al (Sheath, alloy powder)	0.011	0.007	0.033	0.011	0.011	0.011	0.011
Al	Al ₂ O ₃ (Equivalent Al content)	0.045	0.045	0.045	0.037	0.037	0.028	0.043
	Total	0.056	0.052	0.078	0.048	0.048	0.039	0.054
	Ti	0.001	0.001	0.003	0.001	0.001	0.001	0.001
Nb	Nb (Sheath, alloy powder)	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₃ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002
V	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.004	0.004	0.004	0.003	0.003	0.003	0.003
	Total	0.005	0.005	0.005	0.004	0.004	0.004	0.004
B	B (Sheath, alloy powder)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.008	0.008	0.008	0.007	0.007	0.008	0.007
	Total	0.008	0.008	0.008	0.007	0.007	0.008	0.007
Slag-forming material	N	0.014	0.015	0.015	0.013	0.013	0.014	0.014
	Mg	0.798	0.798	0.798	0.657	0.657	0.751	0.751
	Zr	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	7.320	7.320	7.320	6.028	6.028	6.889	6.889
	SiO ₂	0.386	0.386	0.386	0.318	0.318	0.255	0.363
	Al ₂ O ₃	0.085	0.085	0.085	0.070	0.070	0.052	0.080
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.000	0.011
	MgO	0.000	0.000	0.000	0.000	0.000	0.156	0.000
	V ₂ O ₅	0.007	0.007	0.007	0.005	0.005	0.006	0.006
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.050	0.050	0.050	0.041	0.041	0.042	0.047
	K ₂ O	0.039	0.039	0.039	0.032	0.032	0.024	0.037
	CaO	0.000	0.000	0.000	0.000	0.000	0.002	0.000
	B ₂ O ₃	0.027	0.027	0.027	0.022	0.022	0.026	0.023
Fluoride compound	NaF	0.000	0.000	0.000	0.000	0.000	0.075	0.000
	K ₂ SiF ₆	0.304	0.304	0.304	0.250	0.250	0.080	0.286
	CeF ₃	0.000	0.000	0.000	0.000	0.000	0.066	0.000
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000	0.016
	Total (Equivalent F content)	0.157	0.157	0.157	0.130	0.130	0.094	0.148
Other elements		0.009	0.009	0.009	0.008	0.008	0.023	0.009
Total Ti/N		313	287	290	276	277	287	285
								287

Table 4

Wire No.	Comparative example 9	Comparative example 10	Comparative example 11	Comparative example 12	Comparative example 13	Comparative example 14	Comparative example 15
Sheath quality	B	B	B	B	B	B	B
Flux ratio (% by mass)	18.0	18.0	15.0	15.0	15.0	15.0	13.0
Slag-forming material content (% by mass)	8.334	8.712	6.795	7.245	6.795	6.495	7.072
Composition (% by mass)	C	0.046	0.051	0.044	0.044	0.044	0.040
	Si	0.670	0.459	0.383	0.383	0.383	0.329
	Mn	0.975	1.520	1.310	1.309	1.310	1.204
	P	0.007	0.007	0.007	0.007	0.008	0.007
	S	0.005	0.005	0.005	0.005	0.005	0.004
	Cu	0.010	0.009	0.010	0.010	0.010	0.010
	Ni	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.568	1.623	1.356	1.356	1.356	1.157
	Mo	0.565	0.531	0.443	0.443	0.443	0.384
	Al (Sheath, alloy powder)	0.020	0.465	0.007	0.007	0.007	0.007
	Al ₂ O ₃ (Equivalent Al content)	0.490	0.048	0.040	0.047	0.040	0.033
	Total	0.510	0.513	0.047	0.054	0.047	0.040
	Ti	0.001	0.001	0.001	0.001	0.001	0.001
	Nb (Sheath, alloy powder)	0.002	0.002	0.016	0.009	0.002	0.002
Nb	Nb ₂ O ₃ (Equivalent Nb content)	0.000	0.000	0.001	0.008	0.001	0.010
	Total	0.002	0.002	0.017	0.017	0.003	0.012
	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.013	0.001
V	V ₂ O ₃ (Equivalent V content)	0.003	0.004	0.005	0.012	0.005	0.015
	Total	0.004	0.005	0.006	0.013	0.018	0.016
	B (Sheath, alloy powder)	0.000	0.000	0.000	0.000	0.000	0.000
B	B ₂ O ₃ (Equivalent B content)	0.009	0.009	0.007	0.007	0.007	0.000
	Total	0.009	0.009	0.007	0.007	0.007	0.000
	N	0.016	0.016	0.014	0.014	0.014	0.010
Slag-forming material	Mg	0.845	0.845	0.704	0.599	0.704	0.704
	Zr	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	6.474	7.750	5.967	5.083	5.967	5.489
	SiO ₂	0.457	0.409	0.849	1.558	0.349	0.401
	Al ₂ O ₃	0.927	0.090	0.075	0.088	0.075	0.073
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.000
	MgO	0.000	0.000	0.000	0.000	0.000	0.000
	V ₂ O ₅	0.006	0.007	0.008	0.021	0.008	0.026
	Nb ₂ O ₅	0.000	0.000	0.002	0.011	0.002	0.014
	Na ₂ O	0.059	0.053	0.044	0.044	0.044	0.012
	K ₂ O	0.047	0.041	0.035	0.036	0.035	0.028
	CaO	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃	0.029	0.029	0.024	0.024	0.024	0.000
	Fluoride compound	NaF	0.000	0.000	0.000	0.000	0.000
	K ₂ SiF ₆	0.322	0.322	0.268	0.268	0.268	0.233
	CeF ₃	0.000	0.000	0.000	0.000	0.000	0.000
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.167	0.167	0.139	0.139	0.139	0.120
	Other elements	0.013	0.010	0.023	0.112	0.023	0.119
	Total Ti/N	244	293	259	221	259	399

Table 5

Wire No.	Comparative example 16	Comparative example 17	Comparative example 18	Comparative example 19	Comparative example 20	Comparative example 21	Comparative example 22	
Sheath quality	B	B	B	B	B	B	B	
Flux ratio (% by mass)	13.0	13.0	13.0	13.0	15.0	15.5	14.0	
Slag-forming material content (% by mass)	7.452	7.085	7.189	7.267	7.260	7.502	7.685	
Composition (% by mass)								
Al	C Si Mn P S Cu Ni Cr Mo Al (Sheath, alloy powder) Al_2O_3 (Equivalent Al content) Total Ti	0.040 0.329 1.203 0.007 0.004 0.010 0.010 1.157 0.384 0.007 0.039 0.045 0.001	0.040 0.329 1.204 0.007 0.004 0.010 0.010 1.157 0.384 0.010 0.033 0.043 0.001	0.039 0.321 1.166 0.007 0.005 0.010 0.010 1.102 0.384 0.007 0.035 0.042 0.001	0.040 0.362 1.165 0.007 0.005 0.010 0.010 1.377 0.384 0.007 0.035 0.042 0.001	0.044 0.383 1.056 0.007 0.005 0.010 0.010 1.356 0.443 0.007 0.040 0.047 0.001	0.045 0.394 1.080 0.007 0.005 0.010 0.010 1.392 0.457 0.007 0.041 0.048 0.001	0.042 0.359 1.236 0.007 0.005 0.010 0.010 1.281 0.413 0.007 0.294 0.301 0.001
Nb	Nb (Sheath, alloy powder) Nb_2O_5 (Equivalent Nb content) Total	0.002 0.000 0.002	0.002 0.000 0.002	0.002 0.000 0.002	0.002 0.000 0.002	0.002 0.000 0.002	0.002 0.000 0.002	
V	V (Sheath, alloy powder) V_2O_3 (Equivalent V content) Total	0.001 0.003 0.004	0.001 0.003 0.004	0.001 0.003 0.004	0.001 0.003 0.004	0.001 0.003 0.004	0.001 0.002 0.003	
B	B (Sheath, alloy powder) B_2O_3 (Equivalent B content) Total	0.000 0.022 0.022	0.022 0.001 0.023	0.000 0.005 0.006	0.000 0.006 0.006	0.000 0.007 0.007	0.000 0.008 0.008	
N	N	0.010	0.010	0.003	0.037	0.014	0.013	
Mg	Mg	1.169	1.169	0.519	0.519	0.180	1.517	
Zr	Zr	0.000	0.000	0.000	0.000	0.000	0.000	
Slag-forming material	TiO_2 SiO_2 Al_2O_3 ZrO_2 MgO V_2O_5 Nb_2O_5 Na_2O K_2O CaO B_2O_3	6.494 0.439 0.074 0.000 0.000 0.008 0.000 0.101 0.035 0.000 0.069	6.494 0.241 0.062 0.000 0.000 0.006 0.000 0.015 0.028 0.000 0.002	6.494 0.296 0.066 0.000 0.000 0.006 0.000 0.039 0.030 0.000 0.021	6.494 0.296 0.066 0.000 0.000 0.006 0.000 0.039 0.030 0.000 0.021	6.459 0.341 0.075 0.000 0.000 0.006 0.000 0.044 0.035 0.000 0.024	6.674 0.352 0.078 0.000 0.000 0.006 0.000 0.046 0.036 0.000 0.025	4.126 2.258 0.556 0.000 0.000 0.004 0.000 0.287 0.198 0.000 0.025
Fluoride compound	NaF K_2SiF_6 CeF_3 CaF_2 Total (Equivalent F content) Other elements	0.000 0.233 0.000 0.000 0.120 0.012	0.000 0.233 0.000 0.000 0.120 0.004	0.000 0.233 0.000 0.032 0.120 0.006	0.000 0.268 0.000 0.000 0.148 0.013	0.000 0.277 0.000 0.000 0.139 0.008	0.000 0.250 0.000 0.000 0.144 0.008	
	Total Ti/N	400	399	1326	105	280	306	
							166	

Table 6

Wire No.	Comparative example 23	Comparative example 24	Comparative example 25	Comparative example 26	Comparative example 27	Comparative example 28	Comparative example 29	
Sheath quality	B	B	B	B	B	B	B	
Flux ratio (% by mass)	14.0	13.0	16.0	16.0	14.0	18.0	14.0	
Slag-forming material content (% by mass)	9.002	7.644	8.848	7.744	6.874	8.694	8.035	
Composition (% by mass)	C	0.034	0.040	0.046	0.047	0.042	0.047	0.041
	Si	0.367	0.332	0.395	0.049	0.360	0.325	0.343
	Mn	1.230	1.165	1.266	0.502	1.140	1.033	1.275
	P	0.006	0.007	0.007	0.006	0.007	0.007	0.007
	S	0.005	0.004	0.005	0.005	0.005	0.005	0.004
	Cu	0.010	0.010	0.010	0.010	0.010	0.010	0.010
	Ni	0.010	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.356	1.178	1.396	1.378	1.281	1.153	1.292
	Mo	0.413	0.384	0.472	0.472	0.413	0.531	0.413
	Al (Sheath, alloy powder)	0.013	0.007	0.007	0.007	0.007	0.465	0.007
	Al ₂ O ₃ (Equivalent Al content)	0.029	0.035	0.042	0.043	0.132	0.048	0.042
	Total	0.042	0.042	0.049	0.050	0.139	0.513	0.049
	Ti	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	Nb (Sheath, alloy powder)	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₅ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.004	0.004	0.004	0.003	0.002	0.004	0.004
	Total	0.005	0.005	0.005	0.004	0.003	0.005	0.005
	B (Sheath, alloy powder)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.008	0.006	0.007	0.008	0.008	0.008	0.023
	Total	0.008	0.006	0.007	0.008	0.008	0.008	0.023
Slag-forming material	N	0.013	0.012	0.014	0.014	0.015	0.038	0.038
	Mg	0.559	0.610	0.639	0.799	0.657	0.845	1.259
	Zr	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	8.322	7.143	7.193	6.889	4.126	7.750	6.993
	SiO ₂	0.271	0.289	0.355	0.363	1.042	0.399	0.473
	Al ₂ O ₃	0.055	0.065	0.080	0.080	0.249	0.090	0.079
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MgO	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	V ₂ O ₅	0.007	0.006	0.006	0.005	0.004	0.007	0.006
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.046	0.036	0.044	0.047	0.103	0.049	0.109
	K ₂ O	0.019	0.030	0.037	0.037	0.085	0.041	0.038
	CaO	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃	0.025	0.019	0.023	0.026	0.025	0.026	0.075
	Fluoride compound	NaF	0.000	0.000	0.000	0.606	0.000	0.000
	K ₂ SiF ₆	0.250	0.039	1.097	0.286	0.557	0.322	0.250
	CeF ₃	0.000	0.011	0.000	0.000	0.000	0.000	0.000
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.130	0.023	0.568	0.148	0.562	0.167	0.130
	Other elements	0.006	0.007	0.013	0.009	0.078	0.009	0.013
	Total Ti/N	384	348	298	305	166	121	111

Table 7

Wire No.	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7
Sheath quality	A	B	B	B	B	B	B
Flux ratio (% by mass)	15.0	15.0	15.0	18.0	18.0	13.0	14.0
Slag-forming material content (% by mass)	7.260	7.260	7.245	8.910	8.910	6.565	7.140
Composition (% by mass)	C	0.170	0.035	0.037	0.044	0.043	0.035
	Si	0.487	0.073	0.841	0.417	0.271	0.357
	Mn	0.640	1.217	0.817	0.569	1.573	1.008
	P	0.012	0.006	0.007	0.007	0.007	0.006
	S	0.007	0.005	0.005	0.005	0.005	0.005
	Cu	0.011	0.010	0.010	0.010	0.010	0.010
	Ni	0.012	0.010	0.010	0.010	0.010	0.010
	Cr	1.125	1.293	1.294	1.548	1.548	2.524
	Mo	0.380	0.443	0.443	0.531	0.531	0.978
	Al	0.033	0.007	0.022	0.007	0.007	0.007
Slag-forming material	Al ₂ O ₃ (Equivalent Al content)	0.040	0.040	0.040	0.048	0.048	0.035
	Total	0.073	0.047	0.062	0.035	0.055	0.043
	Ti	0.001	0.001	0.002	0.001	0.001	0.001
	Nb	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₃ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.008	0.003	0.003	0.004	0.004	0.003
	Total	0.004	0.004	0.004	0.005	0.005	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000
Fluoride compound	B ₂ O ₃ (Equivalent B content)	0.007	0.007	0.007	0.009	0.009	0.007
	Total	0.007	0.007	0.007	0.009	0.009	0.007
	N	0.012	0.013	0.013	0.015	0.015	0.011
	Mg	0.599	0.599	0.599	0.719	0.719	0.519
	Zr	0.109	0.033	0.033	0.261	0.163	0.118
	TiO ₂	6.459	6.459	5.994	7.553	7.553	5.455
	SiO ₂	0.341	0.341	0.341	0.467	0.467	0.301
	Al ₂ O ₃	0.075	0.075	0.075	0.090	0.090	0.066
	ZrO ₂	0.000	0.000	0.000	0.299	0.299	0.129
	MgO	0.000	0.000	0.000	0.000	0.000	0.269
Other elements	V ₂ O ₅	0.005	0.006	0.005	0.007	0.007	0.005
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.044	0.044	0.044	0.053	0.053	0.039
	K ₂ O	0.035	0.035	0.035	0.041	0.041	0.030
	CaO	0.000	0.000	0.000	0.000	0.000	0.003
	B ₂ O ₃	0.024	0.024	0.024	0.029	0.029	0.022
	NaF	0.000	0.000	0.141	0.169	0.169	0.122
	K ₂ SiF ₆	0.268	0.268	0.119	0.143	0.143	0.103
	CeF ₃	0.000	0.000	0.374	0.000	0.000	0.058
	CaF ₂	0.000	0.000	0.000	0.035	0.035	0.025
Total Ti/N	Total (Equivalent F content)	0.139	0.139	0.234	0.168	0.168	0.121
	Other elements	0.008	0.008	0.093	0.022	0.022	0.016
	Total Ti/N	320	301	281	306	307	286
							234

Table 8

Wire No.		Example 8	Example 9	Example 10	Example 11	Example 12	Example 13	Example 14
Sheath quality		A	B	B	B	B	B	B
Flux ratio (% by mass)		17.0	16.0	16.0	13.0	15.5	15.5	15.5
Slag-forming material content (% by mass)		8.636	8.272	8.368	7.111	7.549	7.564	7.564
Composition (% by mass)	C	0.064	0.048	0.047	0.040	0.045	0.045	0.046
	Si	0.462	0.624	0.536	0.404	0.526	0.393	0.532
	Mn	1.202	1.379	1.379	1.077	1.343	1.228	1.228
	P	0.011	0.007	0.007	0.007	0.007	0.007	0.007
	S	0.008	0.005	0.005	0.005	0.005	0.005	0.005
	Cu	0.011	0.010	0.010	0.010	0.010	0.010	0.010
	Ni	0.012	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	2.482	1.445	1.278	1.158	1.280	1.214	1.354
	Mo	1.068	0.472	0.472	0.408	0.457	0.457	0.457
	Al	0.032	0.167	0.007	0.007	0.008	0.007	0.007
	Al_2O_3 (Equivalent Al content)	0.046	0.295	0.043	0.033	0.041	0.041	0.041
	Total	0.078	0.462	0.050	0.041	0.049	0.050	0.048
	Ti	0.072	0.068	0.068	0.001	0.286	0.066	0.066
	Nb	0.002	0.002	0.003	0.002	0.002	0.002	0.002
	Nb_2O_5 (Equivalent Nb content)	0.000	0.000	0.003	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.006	0.002	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	V_2O_3 (Equivalent V content)	0.004	0.003	0.007	0.003	0.003	0.003	0.003
	Total	0.005	0.004	0.008	0.004	0.004	0.004	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B_2O_3 (Equivalent B content)	0.009	0.008	0.008	0.002	0.008	0.009	0.009
	Total	0.009	0.008	0.008	0.002	0.018	0.009	0.009
Slag-forming material	N	0.013	0.014	0.019	0.007	0.023	0.006	0.033
	Mg	0.849	0.751	0.751	0.234	0.728	0.728	0.728
	Zr	0.154	0.145	0.116	0.000	0.112	0.028	0.112
	TiO_2	7.133	6.889	7.135	6.494	6.674	6.674	6.674
	SiO_2	0.394	0.363	0.384	0.255	0.352	0.360	0.360
	Al_2O_3	0.086	0.568	0.080	0.063	0.078	0.078	0.078
	ZrO_2	0.168	0.000	0.000	0.000	0.000	0.000	0.000
	MgO	0.326	0.000	0.156	0.000	0.000	0.000	0.000
	V_2O_5	0.006	0.006	0.012	0.006	0.006	0.006	0.006
	Nb_2O_5	0.000	0.000	0.004	0.000	0.000	0.000	0.000
	Na_2O	0.050	0.049	0.047	0.021	0.046	0.049	0.049
	K_2O	0.039	0.037	0.037	0.028	0.036	0.036	0.036
	CaO	0.004	0.000	0.002	0.000	0.000	0.000	0.000
	B_2O_3	0.028	0.026	0.026	0.007	0.025	0.028	0.028
	NaF	0.160	0.000	0.000	0.000	0.000	0.000	0.000
	K_2SiF_6	0.135	0.286	0.286	0.233	0.277	0.277	0.277
	CeF_3	0.042	0.040	0.000	0.000	0.039	0.039	0.039
	CaF_2	0.033	0.000	0.156	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.171	0.160	0.224	0.120	0.155	0.155	0.155
	Other elements	0.030	0.017	0.042	0.005	0.016	0.017	0.017
	Total Ti/N	328	291	233	539	184	679	125

Table 9

Wire No.	Example 15	Example 16	Example 17	Example 18	Example 19	Example 20	Example 21
Sheath quality	B	A	B	B	B	B	B
Flux ratio (% by mass)	15.5	15.5	15.5	15.0	16.0	16.0	16.0
Slag-forming material content (% by mass)	7.649	7.502	7.146	8.730	7.512	8.592	6.256
Composition (% by mass)	C	0.040	0.060	0.044	0.043	0.046	0.049
	Si	0.556	0.388	0.354	0.342	0.396	0.365
	Mn	1.169	1.124	1.228	1.192	1.268	1.265
	P	0.007	0.011	0.007	0.007	0.007	0.007
	S	0.005	0.007	0.005	0.004	0.005	0.005
	Cu	0.010	0.011	0.010	0.010	0.010	0.010
	Ni	0.010	0.012	0.010	0.010	0.010	0.010
	Cr	1.351	1.362	1.280	1.239	1.396	1.396
	Mo	0.457	0.460	0.457	0.443	0.472	0.452
	Al	0.007	0.032	0.007	0.007	0.007	0.007
	Al_2O_3 (Equivalent Al content)	0.041	0.041	0.047	0.032	0.043	0.042
	Total	0.048	0.073	0.054	0.039	0.050	0.049
	Ti	0.163	0.033	0.098	0.126	0.034	0.201
	Nb	0.002	0.002	0.002	0.002	0.002	0.002
	Nb_2O_3 (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.001	0.001	0.001
Slag-forming material	V_2O_3 (Equivalent V content)	0.003	0.003	0.002	0.004	0.003	0.003
	Total	0.004	0.004	0.003	0.005	0.004	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000
	B_2O_3 (Equivalent B content)	0.008	0.008	0.009	0.007	0.008	0.008
	Total	0.008	0.008	0.009	0.007	0.008	0.008
	N	0.008	0.007	0.023	0.023	0.015	0.014
	Mg	0.232	1.487	0.728	0.704	0.751	0.761
	Zr	0.112	0.000	0.000	0.000	0.000	0.000
	TiO_2	6.674	6.674	4.336	8.017	6.889	6.889
	SiO_2	0.352	0.352	0.851	0.280	0.363	0.364
	Al_2O_3	0.078	0.078	0.089	0.060	0.080	0.080
	ZrO_2	0.000	0.000	0.936	0.000	0.000	0.000
	MgO	0.000	0.000	0.455	0.000	0.000	0.000
Fluoride compound	V_2O_5	0.006	0.006	0.004	0.007	0.006	0.005
	Nb_2O_5	0.000	0.000	0.000	0.000	0.000	0.000
	Na_2O	0.046	0.046	0.052	0.041	0.047	0.047
	K_2O	0.036	0.036	0.041	0.027	0.037	0.037
	CaO	0.000	0.000	0.007	0.000	0.000	0.000
	B_2O_3	0.026	0.025	0.028	0.024	0.026	0.026
	NaF	0.000	0.000	0.000	0.000	0.452	0.000
	K_2SiF_6	0.277	0.277	0.277	0.268	0.048	0.557
	CeF_3	0.039	0.000	0.039	0.000	0.007	0.040
	CaF_2	0.000	0.000	0.000	0.000	0.047	0.000
Other elements	Total (Equivalent F content)	0.155	0.144	0.155	0.139	0.027	0.527
	Other elements	0.016	0.008	0.032	0.005	0.009	0.047
	Total Ti/N	517	558	115	218	287	299
							135

Table 10

Wire No.	Example 22	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28		
Sheath quality	B	C	C	C	C	A	B		
Flux ratio (% by mass)	18.0	15.0	17.0	15.0	12.0	16.0	14.0		
Slag-forming material content (% by mass)	9.720	7.260	7.701	6.793	6.636	7.744	6.804		
Composition (% by mass)	C	0.054	0.049	0.051	0.048	0.043	0.068	0.043	
	Si	0.410	0.563	0.434	0.493	0.453	0.368	0.447	
	Mn	1.257	1.275	1.293	1.275	1.246	0.974	0.984	
	P	0.007	0.004	0.004	0.004	0.003	0.012	0.007	
	S	0.005	0.007	0.007	0.007	0.007	0.007	0.005	
	Cu	0.009	0.011	0.011	0.011	0.011	0.011	0.010	
	Ni	0.010	0.043	0.042	0.043	0.044	0.012	0.010	
	Cr	1.483	1.269	1.253	1.341	1.293	1.522	2.250	
	Mo	0.508	0.502	0.505	0.502	0.498	0.505	0.878	
	Al	0.007	0.004	0.004	0.004	0.004	0.032	0.007	
	Al_2O_3 (Equivalent Al content)	0.038	0.040	0.045	0.040	0.032	0.043	0.037	
	Total	0.045	0.044	0.049	0.043	0.036	0.075	0.044	
	Ti	0.114	0.002	0.144	0.127	0.002	0.001	0.001	
	Nb	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
	Nb_2O_3 (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
	V	0.001	0.003	0.002	0.003	0.003	0.001	0.001	
	V_2O_3 (Equivalent V content)	0.004	0.003	0.003	0.003	0.003	0.003	0.003	
	Total	0.005	0.006	0.005	0.006	0.006	0.004	0.004	
	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	B_2O_3 (Equivalent B content)	0.009	0.007	0.008	0.007	0.006	0.008	0.008	
	Total	0.009	0.007	0.008	0.007	0.006	0.008	0.008	
	N	0.027	0.018	0.019	0.027	0.016	0.023	0.019	
	Mg	0.899	0.674	0.764	0.674	0.539	0.799	0.699	
	Zr	0.000	0.081	0.000	0.027	0.000	0.000	0.000	
Slag-forming material	TiO_2	7.912	6.459	6.793	5.994	5.994	6.889	5.594	
	SiO_2	0.624	0.341	0.386	0.341	0.273	0.363	0.374	
	Al_2O_3	0.071	0.075	0.085	0.075	0.061	0.080	0.071	
	ZrO_2	0.604	0.000	0.000	0.000	0.000	0.000	0.094	
	MgO	0.000	0.000	0.000	0.000	0.000	0.000	0.133	
	V_2O_5	0.007	0.006	0.006	0.005	0.005	0.006	0.005	
	Nb_2O_5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	Na_2O	0.050	0.044	0.050	0.044	0.036	0.047	0.046	
	K_2O	0.033	0.035	0.039	0.035	0.028	0.037	0.030	
	CaO	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
	B_2O_3	0.029	0.024	0.027	0.024	0.019	0.026	0.025	
	Fluoride compound	NaF	0.000	0.000	0.000	0.000	0.000	0.013	
		K_2SiF_6	0.322	0.268	0.304	0.268	0.215	0.286	0.250
		CeF_3	0.045	0.000	0.000	0.000	0.000	0.116	
		CaF_2	0.000	0.000	0.000	0.000	0.000	0.014	
		Total (Equivalent F content)	0.180	0.139	0.157	0.139	0.111	0.148	0.176
		Other elements	0.024	0.008	0.010	0.008	0.006	0.009	0.035
		Total Ti/N	183	215	218	138	225	178	172

Table 11

Wire No.	Example 29	Example 30	Example 31	Example 32	Example 33	Example 34	Example 35	
Sheath quality	B	B	B	D	D	B	B	
Flux ratio (% by mass)	15.0	15.0	15.5	16.0	14.0	13.0	15.0	
Slag-forming material content (% by mass)	7.290	7.245	7.487	7.216	6.314	7.215	8.325	
Composition (% by mass)	C	0.051	0.059	0.062	0.055	0.052	0.044	0.050
	Si	0.663	0.461	0.518	0.463	0.465	0.471	0.606
	Mn	1.037	1.035	1.062	1.251	1.232	1.236	1.240
	P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	S	0.005	0.005	0.005	0.005	0.005	0.004	0.004
	Cu	0.010	0.010	0.009	0.012	0.012	0.010	0.010
	Ni	0.010	0.010	0.010	0.026	0.027	0.010	0.010
	Cr	2.338	2.338	2.416	2.134	2.173	1.178	1.282
	Mo	0.940	0.940	0.972	0.994	1.007	0.400	0.462
	Al	0.007	0.007	0.007	0.002	0.002	0.007	0.007
	Al ₂ O ₃ (Equivalent Al content)	0.040	0.039	0.041	0.042	0.036	0.035	0.041
	Total	0.047	0.046	0.048	0.044	0.038	0.042	0.048
	Ti	0.001	0.126	0.130	0.135	0.001	0.001	0.126
	Nb	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₃ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.003	0.003	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.003	0.003	0.003	0.003	0.003	0.003	0.004
	Total	0.004	0.004	0.004	0.006	0.006	0.004	0.005
	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.008	0.006	0.006	0.006	0.005	0.008	0.009
	Total	0.008	0.006	0.006	0.006	0.005	0.008	0.009
Slag-forming material	N	0.021	0.021	0.021	0.018	0.017	0.010	0.010
	Mg	0.749	0.749	0.774	0.799	0.699	1.273	0.749
	Zr	0.136	0.000	0.028	0.029	0.025	0.094	0.163
	TiO ₂	5.994	5.994	6.194	6.394	5.594	6.494	7.493
	SiO ₂	0.401	0.378	0.390	0.347	0.304	0.309	0.357
	Al ₂ O ₃	0.076	0.074	0.077	0.079	0.069	0.066	0.077
	ZrO ₂	0.101	0.101	0.104	0.000	0.000	0.000	0.000
	MgO	0.143	0.143	0.148	0.000	0.000	0.000	0.000
	V ₂ O ₅	0.005	0.005	0.006	0.006	0.005	0.006	0.007
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.050	0.040	0.041	0.042	0.037	0.044	0.051
	K ₂ O	0.032	0.031	0.032	0.033	0.029	0.030	0.035
	CaO	0.002	0.002	0.002	0.000	0.000	0.000	0.000
	B ₂ O ₃	0.027	0.019	0.020	0.020	0.017	0.025	0.029
	Fluoride compound	NaF	0.014	0.014	0.015	0.000	0.000	0.000
	K ₂ SiF ₆	0.268	0.268	0.277	0.286	0.250	0.233	0.268
	CeF ₃	0.125	0.125	0.129	0.000	0.000	0.000	0.000
	CaF ₂	0.015	0.015	0.015	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.188	0.188	0.195	0.148	0.130	0.120	0.139
	Other elements	0.038	0.037	0.038	0.009	0.008	0.007	0.008
	Total Ti/N	174	180	181	215	194	400	450

Table 12

Welding current (A) (DCEP)	Arc voltage (V)	Welding speed (cm/min)	Welding position	Shielding gas flow rate (l/min)	Preheating and interpass temperature (°C)	Remarks
270	27 - 32	25 - 30	Flat position	Refer to tables for composition, Flow rate: 25	176 ± 15	2.25 Cr-1 Mo alloys 1.25 Cr-0.5 Mo alloys
					150 ± 15	0.5 Mo alloys

Table 13

Welding current (A) (DCEP)	Arc voltage (V)	Welding speed (cm/min)	Welding position	Shielding gas flow rate (l/min)	Preheating and interpass temperature (°C)	Remarks
180	22 - 26	20 - 30	Vertical position	Refer to tables for composition, Flow rate: 25	176 ± 15	2.25 Cr-1 Mo alloys 1.25 Cr-0.5 Mo alloys
					150 ± 15	0.5 Mo alloys

Table 14

Flux-cored wires	Conditions for acceptable tensile property			Conditions for acceptable impact performance 2 mm V-18°C
	0.2%-Offset yield strength	Tensile strength	Elongation	
Comparative example 1 - 5, 7, 9 - 29	Min. 470 Mpa	560 - 690 Mpa	Min. 19%	
Example 1 - 5, 9 - 27, 34, 35				
Comparative example 6, 8	Min. 540 Mpa	620 - 760 Mpa	Min. 17%	55 J or above
Example 6, 8, 28 - 33				
Example 7	Min. 400 Mpa	480 - 620 Mpa	Min. 20%	

Example 7: 620°C × 1 hr, Furnace cooling

Others: 690°C × 1 hr, Furnace cooling

Table 15

Flux-cored wire	Comparative example 1	Comparative example 2	Comparative example 3	Comparative example 4	Comparative example 5	Comparative example 6	Comparative example 7	Comparative example 8
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
C	0.209	0.048	0.049	0.045	0.066	0.051	0.050	0.045
Si	0.73	0.06	1.56	0.58	0.62	0.68	0.65	0.47
Mn	1.06	1.01	1.02	0.39	1.17	1.00	1.00	0.99
P	0.007	0.008	0.007	0.007	0.007	0.007	0.007	0.007
S	0.009	0.010	0.009	0.009	0.009	0.009	0.009	0.010
Cu	0.015	0.015	0.015	0.015	0.015	0.014	0.015	0.014
Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.48	1.28	1.28	1.21	1.21	2.56	1.35	2.31
Mo	0.56	0.56	0.56	0.46	0.46	1.06	0.32	1.70
Al	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002
Ti	0.101	0.048	0.215	0.039	0.155	0.098	0.094	0.094
Nb	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002
V	0.009	0.009	0.009	0.007	0.007	0.007	0.007	0.007
B	0.0049	0.0005	0.0049	0.0006	0.0040	0.0046	0.0046	0.0041
N	0.012	0.013	0.013	0.011	0.011	0.013	0.013	0.013
Usability,	Good	Bad	Good	Good	Bad	Good	Good	Good
Radiographic examination	JIS Class 1 or below (HC)	JIS Class 1 or below (HC)	JIS Class 1 or below (BH)					
Tensile strength (MPa)	732	572	728	541	740	775	545	769
Test results	0.2%-Offset yield strength (MPa)	602	475	612	445	642	583	444
	Elongation (%)	21	24	20	28	18	19	22
	2 mmVE-18°C (Avg. J)	33	14	13	19	22	21	21
	Ferrite band suppression	Acceptable	Unacceptable	Acceptable	Unacceptable	Acceptable	Acceptable	Acceptable

*HC: Hot cracking, BH: Blow holes

Table 16

Flux-cored wire	Comparative example 9	Comparative example 10	Comparative example 11	Comparative example 12	Comparative example 13	Comparative example 14	Comparative example 15
Designation of material of plates	A387 Gr.11 C1.2						
Shielding gas	80%Ar+20%CO ₂						
C	0.055	0.062	0.053	0.053	0.053	0.052	0.047
Si	0.74	0.51	0.42	0.42	0.42	0.42	0.36
Mn	0.72	1.12	0.95	0.95	0.95	0.94	0.37
P	0.007	0.007	0.007	0.008	0.007	0.008	0.007
S	0.009	0.009	0.009	0.009	0.009	0.010	0.009
Cu	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.52	1.58	1.29	1.30	1.29	1.29	1.11
Mo	0.63	0.60	0.49	0.49	0.49	0.49	0.42
Al	0.022	0.022	0.002	0.002	0.002	0.002	0.002
Ti	0.169	0.204	0.081	0.069	0.081	0.074	0.088
Nb	0.002	0.002	0.019	0.018	0.003	0.013	0.003
V	0.007	0.008	0.010	0.022	0.031	0.026	0.007
B	0.0052	0.0052	0.0043	0.0043	0.0043	0.0043	0.0000
N	0.014	0.014	0.012	0.012	0.012	0.012	0.008
Usability,	Good						
Radiographic examination*	JIS class 1						
Test results							
Tensile strength (MPa)	694	703	675	683	654	664	646
0.2%-Offset yield strength (MPa)	597	599	590	595	565	559	558
Elongation (%)	25	23	24	24	23	23	25
2 mmVE-18°C (Avg. J)	5	7	11	13	21	25	9
Ferrite band suppression	Acceptable						

Table 17

Flux-cored wire	Comparative example 16	Comparative example 17	Comparative example 18	Comparative example 19	Comparative example 20	Comparative example 21	Comparative example 22	
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	
C	0.047	0.047	0.047	0.048	0.053	0.054	0.050	
Si	0.36	0.36	0.35	0.40	0.42	0.43	0.39	
Mn	0.87	0.87	0.85	0.84	0.77	0.79	0.90	
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007	
S	0.009	0.009	0.009	0.009	0.009	0.009	0.009	
Cu	0.015	0.015	0.015	0.015	0.015	0.015	0.015	
Chemical composition (% by mass)	Ni Cr Mo Al Ti Nb V B N	0.015 1.11 0.43 0.002 0.089 0.003 0.007 0.0124 0.009	0.015 1.11 0.42 0.002 0.088 0.003 0.007 0.0132 0.008	0.015 1.06 0.42 0.002 0.088 0.003 0.007 0.0037 0.003	0.015 1.32 0.42 0.002 0.088 0.003 0.007 0.0037 0.032	0.015 1.30 0.49 0.002 0.042 0.003 0.007 0.0037 0.012	0.015 1.34 0.51 0.002 0.151 0.003 0.007 0.0045 0.011	0.015 1.23 0.46 0.013 0.040 0.002 0.005 0.0045 0.013
Usability.	Good	Good	Good	Bad	Good	Bad	Bad	
Radiographic examination*		JIS Class 1 or below (HC)	JIS Class 1	JIS Class 1 or below (BH)	JIS Class 1	JIS Class 1	JIS Class 1	
Tensile strength (MPa)	674	675	563	649	652	663	673	
0.2%-Offset yield strength (MPa)	569	558	567	538	559	561	569	
Elongation (%)	25	24	25	22	25	25	25	
2 mm/18°C (Avg. J)	67	57	33	15	11	32	59	
Ferrite band suppression	Acceptable	Unacceptable	Acceptable	Unacceptable	Acceptable	Unacceptable	Unacceptable	

*HC: Hot cracking, BH: Blow holes

Table 18

Flux-cored wire	Comparative example 23	Comparative example 24	Comparative example 25	Comparative example 26	Comparative example 27	Comparative example 28	Comparative example 29
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
C	0.042	0.048	0.056	0.057	0.050	0.057	0.049
Si	0.41	0.36	0.44	0.05	0.39	0.36	0.38
Mn	0.91	0.85	0.93	0.37	0.82	0.76	0.93
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
S	0.009	0.009	0.009	0.010	0.009	0.009	0.009
Cu	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.32	1.13	1.36	1.33	1.22	1.12	1.25
Mo	0.47	0.43	0.53	0.53	0.46	0.60	0.46
Al	0.002	0.002	0.002	0.002	0.006	0.022	0.002
Ti	0.116	0.046	0.100	0.045	0.048	0.204	0.096
Nb	0.003	0.003	0.003	0.002	0.002	0.002	0.003
V	0.009	0.009	0.009	0.007	0.005	0.008	0.009
B	0.0045	0.0009	0.0041	0.0009	0.0044	0.0047	0.0135
N	0.012	0.011	0.013	0.012	0.013	0.034	0.033
Usability,	Good	Bad	Bad	Bad	Bad	Bad	Bad
Radiographic examination*	JIS Class 1 or below (SI)	JIS class 1	JIS Class 1 or below (BH)	JIS Class 1	JIS Class 1 or below (BH)	JIS Class 1 or below (BH)	JIS Class 1 or below (BH, HC)
Tensile strength (MPa)	679	654	665	532	573	712	673
0.2%-Offset yield strength (MPa)	585	560	573	445	485	625	565
Elongation (%)	26	26	25	23	25	18	21
2 mmVE-18°C (Avg. J)	38	13	65	13	69	18	13
Ferrite band suppression	Acceptable	Unacceptable	Acceptable	Unacceptable	Unacceptable	Acceptable	Acceptable

HC: Hot cracking BH: Blow holes SI: Slag inclusion

Table 19

Flux-cored wire	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.22 C1.2	A204 Gr. A
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	100%CO ₂	100%CO ₂	100%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
Chemical composition (% by mass)							
C	0.147	0.043	0.044	0.054	0.053	0.042	0.043
Si	0.53	0.08	0.73	0.37	0.24	0.39	0.41
Mn	0.46	0.88	0.57	0.41	1.12	0.73	0.78
P	0.012	0.007	0.007	0.007	0.007	0.007	0.007
S	0.013	0.010	0.009	0.010	0.010	0.010	0.009
Cu	0.018	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.018	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.08	1.24	1.19	1.44	1.44	2.40	0.11
Mo	0.42	0.49	0.48	0.58	0.58	1.07	0.52
Al	0.003	0.002	0.003	0.002	0.002	0.002	0.002
Ti	0.088	0.088	0.078	0.099	0.099	0.074	0.080
Nb	0.003	0.003	0.002	0.002	0.002	0.003	0.003
V	0.007	0.007	0.006	0.008	0.008	0.006	0.007
B	0.0043	0.0043	0.0043	0.0052	0.0052	0.0039	0.0042
N	0.011	0.011	0.011	0.013	0.013	0.010	0.013
Usability.	Good	Good	Good	Good	Good	Good	Good
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1
Tensile strength (MPa)	682	673	685	685	683	696	579
0.2%-Offset yield strength (MPa)	595	595	594	598	589	602	483
Elongation (%)	20	25	22	25	24	25	26
2 mmVE-18°C (Avg. J)	120	109	110	108	125	121	82
Ferrite band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 20

Flux-cored wire	Example 8	Example 9	Example 10	Example 11	Example 12	Example 13	Example 14
Designation of material of plates	A387 Gr. 22 C1.2	A387 Gr. 11 C1.2	A387 Gr. 11 C1.2	A387 Gr. 11 C1.2	A387 Gr. 11 C1.2	A387 Gr. 11 C1.2	A387 Gr. 11 C1.2
Shielding gas	100%CO ₂	80%Ar+20%CO ₂	100%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
C	0.077	0.059	0.057	0.048	0.055	0.054	0.055
Si	0.40	0.69	0.47	0.44	0.58	0.43	0.58
Mn	0.86	1.01	0.98	0.73	0.98	0.89	0.89
P	0.012	0.007	0.007	0.007	0.007	0.007	0.007
S	0.015	0.009	0.009	0.009	0.009	0.009	0.009
Cu	0.017	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.018	0.015	0.015	0.015	0.015	0.015	0.015
Cr	2.31	1.40	1.19	1.11	1.23	1.17	1.30
Mo	1.17	0.53	0.52	0.45	0.51	0.51	0.51
Al	0.003	0.020	0.002	0.002	0.002	0.002	0.002
Ti	0.095	0.114	0.095	0.083	0.115	0.110	0.110
Nb	0.002	0.003	0.007	0.003	0.002	0.002	0.002
V	0.008	0.007	0.013	0.007	0.007	0.007	0.007
B	0.0051	0.0045	0.0045	0.0014	0.0104	0.0050	0.0050
N	0.012	0.013	0.016	0.006	0.020	0.005	0.028
Usability	Good	Good	Good	Good	Good	Good	Good
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1
Tensile strength (MPa)	716	673	663	661	681	653	679
0.2%-Offset yield strength (MPa)	623	591	572	562	578	562	567
Elongation (%)	25	25	25	27	24	27	23
2 mm/V-E-18°C (Avg. J)	118	108	92	62	75	89	76
Ferrite band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 21

Flux-cored wire	Example 15	Example 16	Example 17	Example 18	Example 19	Example 20	Example 21
Designation of material of plates	A387 Gr.11 C1.2						
Shielding gas	80%Ar+20%CO ₂						
C	0.049	0.073	0.053	0.052	0.055	0.056	0.058
Si	0.61	0.43	0.39	0.38	0.43	0.44	0.40
Mn	0.85	0.82	0.89	0.88	0.92	0.93	0.82
P	0.007	0.012	0.008	0.007	0.007	0.007	0.007
S	0.009	0.013	0.010	0.009	0.009	0.009	0.009
Cu	0.015	0.017	0.015	0.015	0.015	0.015	0.015
Ni	0.015	0.017	0.015	0.015	0.015	0.015	0.015
Chemical composition (% by mass)							
Cr	1.30	1.30	1.23	1.21	1.34	1.36	1.25
Mo	0.51	0.51	0.51	0.50	0.52	0.53	0.50
Al	0.002	0.003	0.002	0.002	0.002	0.002	0.002
Ti	0.113	0.109	0.073	0.135	0.113	0.118	0.087
Nb	0.002	0.002	0.002	0.003	0.002	0.003	0.002
V	0.007	0.007	0.005	0.008	0.007	0.007	0.005
B	0.0045	0.0045	0.0050	0.0044	0.0046	0.0047	0.0045
N	0.007	0.006	0.020	0.020	0.013	0.013	0.021
Usability	Good						
Radiographic examination	JIS class 1						
Tensile strength (MPa)	649	665	647	673	660	673	662
0.2%-Offset yield strength (MPa)	538	561	552	569	553	561	565
Elongation (%)	28	26	24	22	24	25	24
2 mmVE-18°C (Avg. J)	95	88	84	76	113	115	82
Ferrite band suppression	Acceptable						

Table 22

Flux-cored wire	Example 22	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	80%Ar+20%CO ₂	98%Ar+20%CO ₂	80%Ar+20%CO ₂				
Chemical composition (% by mass)							
C	0.067	0.059	0.061	0.058	0.051	0.082	0.051
Si	0.46	0.63	0.48	0.54	0.49	0.41	0.49
Mn	0.94	1.10	0.94	0.92	0.90	0.71	0.71
P	0.008	0.004	0.004	0.004	0.004	0.012	0.007
S	0.009	0.014	0.014	0.014	0.013	0.013	0.009
Cu	0.015	0.017	0.017	0.017	0.017	0.017	0.015
Ni	0.015	0.063	0.061	0.062	0.064	0.017	0.015
Cr	1.46	1.30	1.21	1.28	1.23	1.47	2.15
Mo	0.58	0.56	0.56	0.55	0.55	0.56	0.97
Al	0.002	0.002	0.002	0.002	0.002	0.003	0.002
Ti	0.135	0.104	0.114	0.100	0.081	0.094	0.076
Nb	0.003	0.003	0.002	0.002	0.003	0.002	0.002
V	0.008	0.010	0.009	0.009	0.010	0.007	0.006
B	0.0053	0.0043	0.0049	0.0043	0.0034	0.0046	0.0045
N	0.024	0.016	0.017	0.023	0.014	0.020	0.017
Usability,	Good	Good	Good	Good	Good	Good	Good
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1
Tensile strength (MPa)	672	659	662	667	672	680	721
Test results	0.2%-Offset yield strength (MPa)	574	549	553	559	562	579
	Elongation (%)	23	24	25	24	26	24
	2 mm/E-18°C (Avg. J)	78	79	88	81	65	68
	Ferile band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 23

Flux-cored wire	Example 29	Example 30	Example 31	Example 32	Example 33	Example 34	Example 35
Designation of material of plates	A387 Gr.22 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2				
Shielding gas	80%Ar+20%CO ₂						
C	0.073	0.071	0.074	0.066	0.061	0.053	0.061
Si	0.73	0.50	0.57	0.51	0.50	0.51	0.67
Mn	0.75	0.75	0.77	0.91	0.88	0.90	0.91
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
S	0.009	0.010	0.010	0.010	0.010	0.009	0.009
Cu	0.015	0.015	0.015	0.018	0.018	0.015	0.015
Ni	0.015	0.015	0.015	0.038	0.039	0.015	0.015
Cr	2.24	2.24	2.32	2.05	2.06	1.13	1.24
Mo	1.04	1.04	1.08	1.10	1.10	0.44	0.52
Al	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Ti	0.082	0.100	0.104	0.107	0.075	0.088	0.106
Nb	0.002	0.002	0.002	0.002	0.002	0.003	0.003
V	0.007	0.007	0.007	0.010	0.011	0.007	0.008
B	0.0049	0.0034	0.0036	0.0036	0.0031	0.0046	0.0053
N	0.018	0.018	0.019	0.016	0.015	0.008	0.009
Usability.	Good						
Radiographic examination	JIS class 1						
Tensile strength (MPa)	732	742	748	746	732	675	678
0.2%-Offset yield strength (MPa)	641	651	653	655	631	573	569
Elongation (%)	26	26	25	25	25	24	25
2 mmVE-18°C (Avg. J)	81	83	89	89	81	132	110
Ferrite band suppression	Acceptable						